

PRELIMINARY NOTIFICATION OF EVENT OR UNUSUAL OCCURRENCE--PNO-I-84-89

This preliminary notification constitutes EARLY notice of events of POSSIBLE safety or public interest significance. The information is as initially received without verification or evaluation, and is basically all that is known by the IE staff on this date.

Facility:
Vermont Yankee Nuclear Power Corp.
Vermont Yankee Nuclear N.P.S.
Vernon, Vermont
Docket No. 50-271

Emergency Classification:
 Notification of Unusual Event
 Alert
 Site Area Emergency
 General Emergency
 Not Applicable

Subject: LOSS OF BOTH DIESEL GENERATORS AT FULL POWER

During plant operations at full power on October 22-23, 1984, two apparently random failures of separate and independent differential protection relays caused both emergency diesel generators to be inoperable. The diesels were in a standby condition, were not operating when the failures occurred, and were not called upon to operate during the time they were inoperable.

The diesels became inoperable when a generator lockout condition occurred as a result of spurious operation of the generator differential relays. The differential relays monitor the difference in current between the generator output and the load side of the bus tie breaker, and are provided in the electrical protection scheme to protect the generator and the 4KV emergency bus against a fault on any of the three phases.

The failure on the 'A' diesel generator occurred at 1:55 p.m. on 10/22; the 'B' diesel generator failure occurred at 1:40 a.m. on 10/23. Following the second failure, the licensee declared an Unusual Event and proceeded to initiate actions to achieve cold shutdown within 24 hours in accordance with Technical Specification requirements. Plant shutdown was terminated at 22% power at 6:23 p.m. on 10/23 when the 'B' diesel generator was returned to service following repair of the differential relay; the 'A' diesel generator was returned to service on 10/24 following repair.

The spurious operation of the generator differential relays was caused in both cases by a zener diode that failed for no apparent reason. The zener diodes are a part of the operating circuit in the Westinghouse Type SA-1 differential relays and provide surge suppression for the silicone controlled rectifier (SCR) firing network. The generator lockout condition and hence, the loss of diesel operability, was annunciated in the main control room for each failure, when it occurred.

The control circuits for each diesel are supplied from separate and independent 125 Volt DC power sources. The differential relays currently installed are original equipment and there have been no previous failures or changes made to the relays. The calibration of the diesel relays are checked each refueling outage on a staggered test basis. No anomalous conditions were noted in the calibration checks completed during the refueling outage which ended in August, 1984. No definitive cause has been identified for the zener diode failures. The licensee has concluded that the diodes reached end of service life.

The relay manufacturer no longer makes the SA-1 relay with zener diodes in the operating circuit. The SCR suppression design was changed to a resistor-capacitor (RC) circuit some time after the units in use at VY were procured. The circuit design change was reportedly made to improve the SA-1 relay to qualify it for Class 1E applications. The licensee was not notified by the vendor that a SA-1 design change was recommended for Class 1E applications.

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Further information from the relay vendor is required to evaluate the significance of the design change and its relation, if any, to the recent failures at VY.

The licensee plans to monitor the performance of the diesel differential relays and continue an investigation of other potential causes for common mode failure. Recorders will be installed on the DC control power supplies to monitor for voltage spikes. The evaluations and actions taken by the licensee to identify other potential common mode failure mechanisms will be followed by the NRC Region I staff.

The states of Vermont, New Hampshire and Massachusetts have been notified.

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